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DOE's National Laboratory Directors Highlight Scientific Merits of GNEP

WASHINGTON , DC – Directors of nine of the Department of Energy's (DOE) national laboratories today announced their support for the Global Nuclear Energy Partnership (GNEP) and discussed the collaboration among the labs in carrying out the partnership. GNEP, part of President Bush's Advanced Energy Initiative, will support advanced technologies to recycle spent nuclear fuel and promote emissions-free nuclear energy in a more proliferation-resistant manner. President Bush has request $250 million in fiscal year (FY) 2007 for GNEP.

"The Global Nuclear Energy Partnership demonstrates the enormous role that advanced nuclear science and technology can play in making the world a better, cleaner, safer place to live by providing abundant, affordable, emissions-free energy while reducing the threat of nuclear weapons proliferation. The national labs will help us realize this vision," Deputy Secretary of Energy Clay Sell said.

The national lab directors have been working together on U.S. energy initiatives for several years and see the definition, development and implementation of GNEP as a unique opportunity to join together to address a significant national and global need. They stressed the urgency of proceeding with the work that will make GNEP a reality. Universities and industry will also be involved in all phases of the partnership.

"Moving forward with the research and technology development proposed under the Global Nuclear Energy Partnership is of great importance to all Americans," said John Grossenbacher, director of the Idaho National Laboratory. "We will be developing and demonstrating in the U.S. new recycling technologies for spent nuclear fuel that may produce more energy, reduce nuclear waste and address proliferation concerns. We also will be working on a new generation of reactors with inherently safe features suitable for fueling the economies of the developing world."

"Our goal is to develop the technology options and analyses that will provide the foundation for future decisions about the direction of the nation's nuclear energy program and the technologies that will be moved into the commercial sector," said Jeff Wadsworth, director of Oak Ridge National Laboratory.

"As the use of nuclear energy expands globally, it is essential that it occurs in a fashion that actually reduces the fears of nuclear proliferation," noted Bob Kuckuck, director of Los Alamos National Laboratory. "We can accomplish this by integrating modern safeguards and nuclear materials management concepts into future nuclear fuel cycles from the very beginning of the process, not adding them after the fact."

Lawrence Livermore National Laboratory Director George Miller stressed that, "U.S. leadership in developing advanced safeguards and security technology is paramount to protect against diversion of nuclear materials by states or sub-state actors. It is critical that we work with suppliers and the International Atomic Energy Agency on an international framework and mechanism for supply, storage and disposal in concert with the global development of technology for advanced fuel recycle, fast reactors and small-scale reactors."

The GNEP Technology Demonstration Program is based on a five-year technology plan, which is currently being developed in consultation with scientists from DOE's national labs. This detailed roadmap for GNEP technology development and demonstration process is focused on technologies that will:

- Separate the high-energy elements of spent nuclear fuel that can be recycled.
- Develop "fast burner" reactors that can convert these high-energy elements into electricity and shorter-lived isotopes, dramatically reducing the volume and toxicity of the waste.
- Integrate modern nuclear materials management concepts into each step of the fuel cycle to increase safeguards confidence.
- Close the nuclear fuel cycle through research and technologies for recycling fuel and fabricating fuel suitable for recycling.

"As we demonstrate these technologies in real applications, we will be able to advance the designs even further and incorporate the lessons we've learned," said Todd Wright, director of the Savannah River National Laboratory. "This is a rigorous process designed to demonstrate the technical credibility of the research that has been and will be conducted."

Three major demonstration facilities are expected to be built, following the decision on the technologies in FY 2008:

- An Engineering-Scale Demonstration of the UREX+ and other advanced processes that separate the useful components in spent nuclear fuel from its waste components, without separating pure plutonium.
- An Advanced Fuel Cycle Facility that will demonstrate advanced proliferation-resistant fuel recycling technologies, including chemical processing; sensors, detectors and monitoring approaches; and fuel fabrication. It also will develop advanced safeguards, including instrumentation for materials protection, control and accountability, and advanced control and monitoring systems.
- An Advanced Burner Test Reactor that will demonstrate the performance of the newly recycled fuel in a facility that will be about one-tenth the size of a current nuclear power plant. This reactor will convert the transuranic elements in spent nuclear fuel into shorter-lived isotopes. As the conversion process takes place, significant energy is released and converted into electricity through environmentally safe channels.

Each of these facilities will yield safety, cost and performance information to guide future commercial designs.

"GNEP will also help advance other technologies that are needed for its implementation. For example, developing more efficient and accurate computer simulation tools is critical to meeting the deployment goals of GNEP, since our current tools are 20 years old. The advanced simulation tools we will develop to support GNEP will take advantage of developments in modeling and computer architecture that will help us rapidly test innovative approaches and improve our ability to control sensitive materials," said Bob Rosner, director of the Argonne National Laboratory.

“Taken together, the nuclear fuel-focused technologies to be developed and demonstrated in GNEP will be an enormous step forward in solving both proliferation and waste management concerns,” said Tom Hunter, director of Sandia National Laboratory. “While the nation must have the Yucca Mountain nuclear waste repository, a successfully implemented GNEP can eliminate the need for additional repositories.”

GNEP also calls for the development of small, proliferation-resistant and naturally safe reactors sized to the electric transmission grids of small, developing nations that need reliable electrical energy for their economic growth.

“Providing clean, dependable and affordable electricity is the single most important commodity we can contribute to improving the quality of life in underdeveloped countries,” said Mike Lawrence, deputy director of Pacific Northwest National Laboratory.

“Ensuring public and worker safety is the foundation for all aspects of GNEP. All facilities and operations within GNEP, including small reactors, actinide burner reactors, fuel cycle facilities, and transportation activities, will be considered as an integrated system and accordingly managed to ensure safety through the program’s lifecycle,” said Peter Bond, deputy director for Science and Technology, of Brookhaven National Laboratory.

DOE national lab directors lead the some of the nation’s most prestigious and productive scientific research laboratories, where more than 30,000 scientists and engineers work to secure our energy, economic and national security through cutting-edge technology. The nine DOE national labs participating in the effort to highlight GNEP today are Argonne National Laboratory, Brookhaven National Laboratory, Idaho National Laboratory, Lawrence Livermore National Laboratory, Los Alamos National Laboratory, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, Sandia National Laboratory and Savannah River National Laboratory.

For more information on GNEP, please visit http://www.gnep.energy.gov/.

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